

REMARKS

I. Introduction

For the reasons set forth below, Applicants respectfully submit that all pending claims are patentable over the cited prior art references.

II. The Rejection Of Claims 1-6 Under 35 U.S.C. § 103

Claims 1, 3-6 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshimoto et al. (US 2003/0104265) in view of Misawa et al. (USP No. 5,158,837); and claim 2 over Yoshimoto and Misawa in further view of Sugita et al. (USP No. 6,723,463). Applicants respectfully traverse the pending rejection for at least the following reasons.

With regard to the present disclosure, claim 1 recites a polymer electrolyte fuel cell in which a gas supply pipe is extended into an inlet manifold beyond an end plate located at a nearest end of a cell stack in the laminating direction of the cell stack, and an extended part of the gas supply pipe has a plurality of holes in the top thereof, which are spaced apart at decreasing intervals inwardly.

One feature of the present disclosure is that an extended part of the gas supply pipe has a plurality of holes in the top which are spaced apart at decreasing intervals inwardly. For example, as shown in Fig. 13 of the present disclosure, the gas supply pipe 11 had a series of holes 31 which are spaced in the top of the gas supply pipe at decreasing intervals along the inward direction. As a result of this feature, the proportion of opening is increased from the opening end to the closed end to prevent the loss of pressure of the supplied gas throughout the inlet manifold.

It is admitted that Yoshimoto fails to teach or suggest a gas supply pipe with a plurality of holes spaced apart at decreasing intervals. Moreover, the Examiner does not suggest that Misawa teaches this limitation. Rather, the Examiner suggests that it would be obvious in view of the fact that Misawa teaches a series of increasing hole sizes spaced equally along the length of the pipe. However, the cost of having a series of increasing hole sizes in a pipe would increase the cost of boring the pipe due to the need to continually change the bits used to cut the pipe. Thus, it is not obvious, in view of Misawa, to space holes at decreasing intervals.

Furthermore, the Examiner admits that Yoshimoto fails to disclose a gas supply pipe extended into the inlet manifold beyond an endplate located at a nearest end of the cell stack. In Yoshimoto, the gas introduced into the inlet manifold enters a plurality of gas passage inlets of each cell to flow through the gas passages and reaches the outlet manifold, from which the gas is exhausted outside the fuel cell. In other words, the gas supply pipe of Yoshimoto is not designed to extend into the inlet manifold because there is no use for it inside the inlet manifold.

Misawa teaches a solid oxide fuel cell that operates at a high temperature of about 1000 °C. A gas flows in a bottom-provided cylindrical solid oxide fuel cell element (i.e., one end 1 is open and the other end 1a is closed as shown in Fig. 14 of Misawa). The flow of gas supplied from the opening of the bottom-provided element stops at the closed end of the element, failing to supply a desired amount of gas to the electrode at the bottom of the element. Thus, in order to uniformly supply the gas to the electrode, it is necessary to use a gas feed pipe to be inserted therein. Further, assuming that the amounts of gas to be supplied through the pipe to the electrode at the bottom, the middle and the vicinity of the opening of the element are equal, for example, 10, 10 and 10 respectively, the amount of gas to be released from the vicinity of the opening is a total of 30. In other words, the amount of gas flowing inside the element varies

greatly and accordingly, a gas feed pipe is required to regulate the gas flow to uniformly supply gas to the electrode. As such, since Yoshimoto does not disclose inserting a gas supply pipe into the inlet manifold because it does not require one, it is not obvious to one skilled in the art to add the gas pipe of Misawa to Yoshimoto.

Another feature of claim 1 is that the gas supply pipe has a plurality of holes in the top. Misawa discloses, in col. 4, lines 62-64 and the figures, that the gas feeding portion of the pipe is provided in a lateral face of the gas feed pipe. For example, Figs. 2 and 4-7 of Misawa show how the gas holes 2 are in the side (lateral) portion of the gas supply pipe. In contrast, Fig. 12 of the present disclosure shows the holes located in the top of the gas supply pipe. Yoshimoto is of course, silent with regard to this feature. As such, the hole configuration in the present disclosure would not be obvious in view of the teachings of either Yoshimoto and Misawa.

Moreover, Misawa teaches, in col. 5, lines 34-38 that the reaction on the electrode and temperature is made uniform, to enhance the electric power generating efficiency. However, this effect is only exerted on a single cell. In contrast, the present disclosure is directed to a uniformity of gas supply among all of the cells. Thus, Misawa is not directed toward a similar goal as that of the present disclosure.

In order to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. As Yoshimoto and Misawa fail to teach or suggest a polymer electrolyte fuel cell in which a gas supply pipe is extended into said inlet manifold beyond an end plate located at a nearest end of said cell stack in the laminating direction of said cell stack, and an extended part of said gas supply pipe has a plurality of holes in the top thereof, which are spaced apart at decreasing intervals inwardly, it is submitted that

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Yoshimoto and Misawa do not render claim 1 obvious. Accordingly, Applicants submit that claim 1 is patentable over the cited prior art.

III. All Dependent Claims Are Allowable Because The Independent Claim From Which They Depend Is Allowable

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as amended claim 1 is patentable for the reasons set forth above, it is respectfully submitted that all pending dependent claims are also in condition for allowance.

IV. Conclusion

Having fully responded to all matters raised in the Office Action, Applicants submit that all claims are in condition for allowance, an indication of which is respectfully solicited.

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To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

McDERMOTT WILL & EMERY LLP



Reg No 53,308

Michael E. Fogarty
Registration No. 36,139

600 13th Street, N.W.
Washington, DC 20005-3096
Phone: 202.756.8000 MEF/NDM:kap
Facsimile: 202.756.8087
Date: December 3, 2009

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as our correspondence address.**